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RESEARCH REPORT

UNITED STATES AIR FORCE CONTRIBUTIONS TO
SAUDI ARABIAN AIR DEFENSE:
PRESENT NEEDS AND FUTURE OPTIONS

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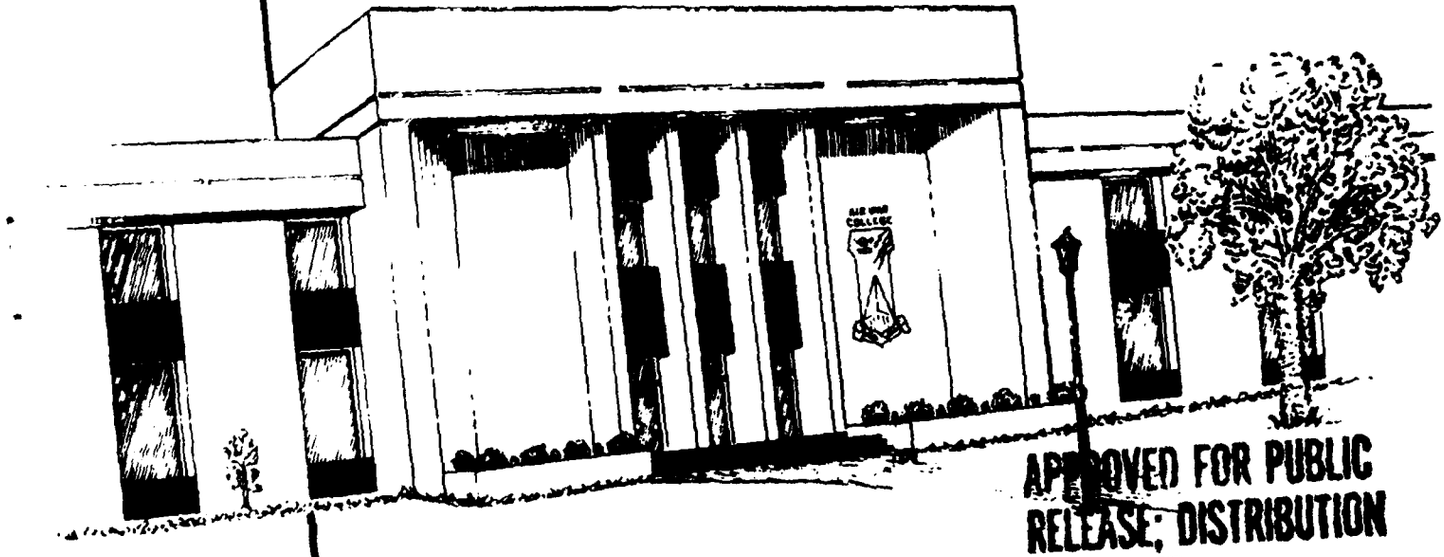

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UNITED STATES AIR FORCE CONTRIBUTIONS TO SAUDI ARABIAN AIR DEFENSE: PRESENT NEEDS AND FUTURE OPTIONS

by

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A DEFENSE ANALYTICAL STUDY SUBMITTED TO THE FACULTY

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Advisor: Colonel Bryant P. Culberson

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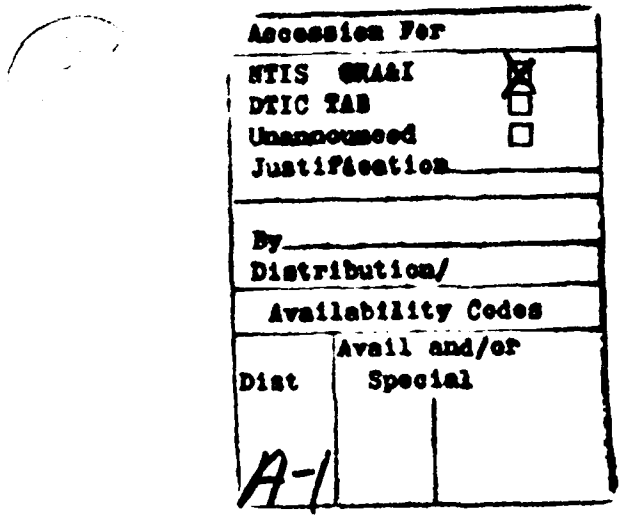

EXECUTIVE SUMMARY

TITLE: United States Air Force Contributions to Saudi Arabian Air Defense: Present Needs and Future Options

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Discusses the background that has led to the long-term augmentation of the Royal Saudi Air Force's (RSAF) air defense system with a detachment of deployed US E-3 Airborne Warning and Control System (AWACS) aircraft which began in September 1980. The regional and global threats to Saudi Arabia are examined, as are the weaknesses present in the RSAF air defense system in the late 1970s and early 1980s. Planned improvements to Saudi air defense under the PEACE SENTINEL and PEACE SHIELD Foreign Military Sales programs are detailed along with the current status of both programs. Recognizing the growing organic air defense capabilities of the Saudi Air Force, an assessment is made with respect to the present and future need for continued active involvement of US AWACS in the defense of the Kingdom of Saudi Arabia. Specific recommendations regarding continued US augmentation are made for a variety of threat scenarios.

BIOGRAPHICAL SKETCHES

Lieutenant Colonel Michael A. Nelson (M.S., University of Southern California) has been involved with the US AWACS program in a variety of staff and operational assignments for the past 14 years. His AWACS experience includes assignments in the United States, Iceland, and Europe, as well as worldwide theater experience as an E-3 Mission Crew Commander. His most recent assignment was as a squadron commander in the 552d Airborne Warning and Control Wing at Tinker AFB, Oklahoma. Lt Col Nelson is a graduate of the Armed Forces Staff College, as well as the Air War College (Class of 1989).

Lieutenant Colonel Thomas P. O'Neill (M.B.A., Arkansas State University) has been involved in Airborne Warning and Control since 1977. He has served as operations officer for the AWACS unit in Keflavik, Iceland, and as squadron commander for both an E-3 NATO Airborne Early Warning (NAEW) squadron in Germany and the AWACS replacement crew training squadron at Tinker AFB, Oklahoma. He also served as the Vice Commander of Central Command's air defense augmentation force (Elf-One) in Saudi Arabia. He is a graduate of the Air Force Air Command and Staff College and the Air War College (Class of 1989).

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CHAPTER I

INTRODUCTION

Saudi Arabia holds an enormous importance for the United States, with the Kingdom's strategic value most often assessed in terms of the country's expansive oil reserves and the importance these reserves hold for the West. The economic significance of an uninterrupted Saudi oil supply is clearly evident when one considers the fact that the Kingdom is the world's leading oil exporter. It accounts for approximately 25 percent of US oil needs, as well as providing nearly 50 percent of Great Britain's requirements, 40 percent of that needed by France and Italy, 35 percent for Japan and Canada, and approximately 33 percent for West Germany. (26:45) Although many of these countries have alternative sources for crude oil (e.g. Alaska for the US, the North Sea for Great Britain and parts of Europe), any curtailment or loss to the West of such a significant aggregate source of petroleum would have a monumental worldwide impact in terms of availability and resulting market price increase of alternative supplies. It is clear that damage to Saudi Arabia's oil production facilities would jeopardize access to the world's most strategic commodity. (22:48)

Saudi Arabia's importance to US national interests in Southwest Asia does not end with its economic significance.

A relatively young nation, Saudi Arabia became a sovereign state after King Abdul Aziz ibn Saud managed to subdue tribal rivalries and build a national consensus in 1932 "by the will of Allah and the strength of my right hand," as he put it. This ability to build a consensus in an area torn by regional rivalries continues to be the genius of the ruling family today. Politically, the US can look upon the Kingdom as a stable and conservative alternative to most of its Arab and non-Arab neighbors in the region. (22:48) Militarily, Saudi Arabia has an importance not only for its own capability to confront potentially hostile actions from any of a number of radical states in the area, but also as a possible base of operations for US forces should a larger regional conflict require US intervention. The strategic geographical position of the Kingdom cannot be overlooked. On balance, it is in the US national interest to have an economically sound and militarily competent Saudi Arabia that can both adequately defend itself and act as a stabilizing force in the region. The Kingdom is considered by the US to be the key to stability in the region, a factor that has become even more important given recent conflicts in the region. (26:42)

When the hostilities between Iran and Iraq began in September 1980, it was readily apparent to both the Saudis and the US that the Kingdom's air defense capabilities were woefully inadequate to counter an attack across the Persian Gulf aimed at the strategically important oil facilities in the vicinity of Ras Tanura. Judging the most critical need

to be increased tactical warning, the US responded with an immediate deployment of E-3 Airborne Warning and Control System (AWACS) aircraft, aerial refueling tankers and selected elements of a ground-based Tactical Air Control System (TACS). At this writing, more than eight years later, US AWACS continue to support Saudi air defenses by providing airborne radar coverage of the Gulf on a 12 hour-per-day basis. Prior to the 1988 cease-fire agreement in the Gulf war, US AWACS had provided 24 hour-per-day radar coverage in the area.

Iraq and Iran are currently abiding by a United Nations sponsored cease-fire, U.N. Resolution 598, that has at least temporarily lowered tensions in the region. Although the outlook for long-term stability in the Gulf area remains uncertain, it is now appropriate to make an assessment of the continuing military need for active USAF involvement in the air defense of Saudi Arabia. This paper will examine potential future threat scenarios, compare them to the Royal Saudi Air Force's (RSAF) organic capability in light of current and planned air defense enhancements, and conclude by identifying potential requirements, if any, for continued active USAF involvement in defense of the Kingdom.

Assumptions

As with any analysis, there remain certain factors that can neither be controlled nor predicted with certainty and have a significant influence on the viability of the

study's outcome. In order to provide the necessary basis for this study, the following assumptions were made:

1. The political relationship between the US and Saudi Arabia will continue essentially unchanged. In a like manner, the relationships and alliances between the nations of the region will basically continue as they now exist.

2. US national interests in the region will not change significantly.

3. The assessments in this study will be made solely on the basis of military and air defense factors. It is not the purpose of this paper to address the diplomatic or political aspects of any decision to increase or decrease US augmentation of Saudi Arabian air defenses.

CHAPTER II

BACKGROUND TO UNITED STATES AUGMENTATION

In the late 1970s and early 1980s, Saudi Arabia faced both global and regional threats in an area of the world that is characterized by complex politics and quickly changing alliances. (19:66) During this period the individual threats varied in intensity, but there was a consistent increase in the capability of potential enemies to conduct effective air operations against targets in Saudi Arabia. The global threat focused on the value of both Saudi political leadership in the Islamic world, as well as its oil resources in relation to the US-Soviet equation. The regional threats came from historic rivalries with South Yemen, Iraq, Iran and Israel. By late 1980, these individual regional threats were overshadowed by the potential spread of the Iran-Iraq war. (7:xv-xx)

Global Threat

The Soviet invasion of Afghanistan, and the instability of Iran following the fall of the Shah, increased the possibility of a Soviet move to control the important oil fields in Iran and the strategic sea lines of communication (SLOCs) through the Persian Gulf. In addition to Saudi Arabia's historical anti-communist position, the Kingdom's cooperative relationship with the US and the fact that the

country contains 25 percent of the world's proven oil reserves (60 percent of all noncommunist oil) made it a potential target for Soviet aggression. (15:100,20:42)

Soviet basing rights in the region, plus the presence of Soviet advisors in South Yemen, added further to a Saudi perception of the threat. (4:39) Although the only Soviet aircraft capable of striking Saudi Arabia were long range bombers flying a high-altitude profile from the Soviet Union, the potential staging of strike aircraft in South Yemen, Iraq, or at possibly overrun Iranian bases concerned Saudi military planners. (7:54) Prince Turki, Chief of Saudi Intelligence, described a potential scenario in which the Soviets would invade Iraq just as they had done in Afghanistan. Under this scenario, the Saudis understood that they did not have the capability to defend any of their critical targets from a Soviet attack. In fact, not only could they not contest a Soviet attack, they were not even capable of protecting critical targets from air attack by less capable regional states. (7:37)

Regional Threats

South Yemen

The Saudis had long been supporters of North Yemen in its ongoing border war with South Yemen. The ill-defined border of the two Yemens stretches 1300 kilometers along Saudi Arabia's southern boundary. The region is sparsely populated and there were no fixed air defense radars

positioned to provide surveillance and control in the area. The delivery of MiG 21s and MiG 23s to South Yemen, and the growing Soviet presence in that country, led to the initial Saudi request for US help in 1979. (7:30,61) As a result of this request, the US deployed AWACS to Saudi Arabia to provide temporary early warning radar coverage in the border area.

Iraq

Saudi Arabia and Iraq share a 1150 kilometer border and have been historical competitors, if not enemies, since the early 1950s. Iraq had long contested Saudi leadership of the Arab world and had made claims to both Saudi and Kuwaiti border territory. (7:9) Iraq had one of the most modern air forces in the region and had the capability to hit most high value targets in Saudi Arabia. (7:60) Saudi Arabia also had reason to believe that the Mecca riots and the takeover of the Mosque in 1979 was sponsored by Iraq in an effort to destabilize and discredit the Saudi monarchy. (11:45)

Iran

Although Iran had been a historical adversary of Saudi Arabia based on religious differences and competition for the oil market, Iranian aggression first became a real possibility when Khomenhi came to power. When the Iran-Iraq war started in September 1980, the Saudis found themselves in a dilemma. Iraq was using the threat of military action

against the Kingdom to coerce the Saudis to support Iraq, while at the same time Iran was using the same kind of threat to force the Saudis to stay out of the war. (7:32)

Saudi Arabia saw the Iranian threat as the most viable given the proximity of the Iranian air bases. The distance between Iran and Saudi Arabia across the Persian Gulf varies from 50 to 350 kilometers, which is quite short for modern attack aircraft. Iranian F-4s based at Bushire and Bander-Abbas are a mere 145 and 300 kilometers, respectively, from the critical Ras Tanura oil processing complex in Saudi Arabia. (7:60) This facility lies on a flat plain on the coast and is less than 15 minutes flying time from Bushire. (8:44) During the early days of the war, Iranian aircraft made incursions across the Gulf but did not actually attack any targets on the peninsula. In September of 1980, however, Iranian F-4s did bomb oil processing facilities in Kuwait only slightly more than 200 kilometers to the north of Ras Tanura. The Saudis saw this as a widening of the threat from the Iran-Iraq war, and a significant increase in risk to oil targets throughout the Gulf. (7:32-34)

US View of the Threat

The US agreed with the Saudi assessment of the Iranian threat, which was viewed as the potential for both naval and aircraft attacks on the oil facilities at Ras Tanura. The US also saw the possibility of Soviet

interdiction of oil as a viable threat and had concern that either the Soviets or the Iranians could close the strategically important Straits of Hormuz. (4:38-40) Additionally, the clearly stated security interests of the US at the time were to insure the free flow of oil (the Carter Doctrine), prevent Soviet inroads in the region, and to restrain Khomenhi. (10:2-5)

CHAPTER III

AIR DEFENSE AUGMENTATION

The Saudis realized as early as the outbreak of the North Yemen-South Yemen border war in 1979 that their air defense capability needed to be upgraded, and in September 1979 Saudi Arabia had asked the US for an Air Defense Feasibility Study. This study was completed in January 1980, and based upon its recommendations the Saudis forwarded to the US, in February 1980, an official request for security assistance. (23:188)

In late 1980, however, Saudi air defense could no longer counter the immediate threat facing the country. Although the Saudis had begun the process necessary to make long term improvements to their air defense system, the growing threat from Iran needed to be countered immediately. Air defense radars could only provide two-to-four minutes warning of a low-level attack across the Gulf. Further, Saudi interceptor aircraft consisted of old British Lightning fighters and US F-5 aircraft. (Although the RSAF had begun to take delivery of their own F-15 aircraft, they were not sufficiently trained in their employment to have an operational capability until 1983. (17:48)) The Lightning and F-5 aircraft lacked an airborne intercept radar that was capable of detecting low-level aircraft, and neither was a sufficient match for the Iranian F-4 or F-14 fighters poised

a short distance across the Gulf. (8:44) Both the US and Saudi Arabia agreed that US military augmentation would be the only viable alternative available in the short term to counter threats to Saudi oil production facilities. In the fall of 1980, following the commencement of both Iranian and Iraqi attacks on a variety of oil targets, the Saudis requested immediate US help to augment their air defense system.

Recognizing the primary need of increased tactical warning of an attack across the Gulf, the US and Saudi Arabia agreed on the deployment of US mobile command, control and communications equipment. This equipment was to provide increased radar detection ranges and to provide a fast relay of target data information to Saudi battle managers on the ground. The system was considered non-provocative since it was totally defensive in nature and no US fighter aircraft were involved. In the near term, and until such time as the RSAF could achieve an operational capability with their own improved fighter aircraft, they would have to rely upon the increased warning time provided by the US AWACS to increase the effectiveness of the aircraft they then possessed. The following US forces were deployed in late 1980:

AWACS

Four Tactical Air Command (TAC) E-3 AWACS aircraft were deployed to Riyadh, Saudi Arabia in September 1980, and began immediate surveillance flights over the eastern part of the country. The use of four aircraft allowed a single orbit

to be flown on a 24 hour-per-day basis indefinitely. Normal flight operations used two overlapping 13-hour sorties each day, with continuous radar coverage of the Gulf ensured by an on-orbit relief of one E-3 by another. Tasked E-3 aircraft and crews were sent to Saudi Arabia on a temporary duty (TDY) basis, and were periodically rotated back to TAC's AWACS Main Operating Base (MOB) at Tinker AFB, Oklahoma.

KC-135 Tanker Aircraft

Three Strategic Air Command (SAC) KC-135 aircraft were deployed along with the E-3s to provide the aerial refueling support necessary to extend the AWACS sorties to a duration of 13 hours. Tanker aircraft and crews were also in TDY status and supported from various SAC bases in the US and overseas. In later years, and as they entered the USAF inventory, KC-10 tankers also shared in the E-3 refueling support role in Saudi Arabia.

Tactical Air Control System (TACS)

To act as a gap filler radar and backup to the AWACS, a USAF TPS-43 Forward Air Control Post (FACP) was deployed from Germany and placed near the coast on a small hill between Dhahran and Jubail. The TPS-43 is a mobile system with a long range three-dimensional (range, azimuth and height) S-band radar. (17:52) Ground radar crews were also in TDY status and rotated from TACS units in both CONUS and Europe.

A TACS Message Processing Center (MPC) was deployed to Riyadh to serve as a buffer for the downlink of the on-

orbit E-3's radar picture to ground-based Saudi air defense authorities. The use of the MPC allowed for a near-instantaneous relay of the E-3's air picture over a secure, automated data link. A TSQ-91 data processing and display van was positioned at Dhahran and co-located with the Saudi air defense Sector Operations Center. This allowed Saudi officers to monitor a real-time pictorial display of air and maritime targets detected by the E-3. (14:82)

The above forces ultimately became known as Elf-One, a command element providing operational control for the deployed forces. Elf-One itself was originally under the operational control of the United States Air Forces Europe (USAFE), but later transferred to the US Central Command in 1983 when that command assumed responsibility for the theater. (9:55)

The US response to the Saudi request for augmentation provided an austere but highly capable enhancement to both radar surveillance in the Gulf and to the rapid relay of that information to Saudi military authorities. Limitations to the system were due primarily to the fact that only the minimum essential amount of equipment was deployed. This resulted in an overall system that was oriented to only one threat axis (albeit the most important one), and in several areas (e.g. the MPC and TSQ-91) comprised of a "single thread" subject to inevitable maintenance interruptions. Although quickly implemented to address the most significant air defense problems at the time, the entire Elf-One

operation has continued to operate most successfully up through the current time, with little or no change to its original configuration or operational concepts. While Elf-One provided the immediate improvement needed, the US and Saudi Arabia worked together in ensuing years to design, build, and train for the badly needed enhancement of the entire Saudi air defense system through the PEACE SHIELD and PEACE SENTINEL programs.

CHAPTER IV

SAUDI AIR DEFENSE IMPROVEMENTS

As a result of the Air Defense Feasibility Study accomplished by the USAF in 1980, a comprehensive security assistance package was formulated under the auspices of two separate but related Foreign Military Sales (FMS) programs. The expansion programs were structured so as to work towards eventual RSAF self-sufficiency in air defense, and were driven by the need to exercise sovereignty over, and to defend, an area comprised of over 2.3 million square kilometers of airspace and 7,000 kilometers of border--an area essentially the size of the US east of the Mississippi River. (1:61) The first program, known as PEACE SENTINEL, involved the purchase of E-3 AWACS and supporting tanker aircraft. The second, named PEACE SHIELD, dealt with a major modernization of the Saudi ground based command, control and communications system. The Boeing Company was selected to be the prime contractor on both programs.

PEACE SENTINEL

Content

In recognition of the need for enhanced low altitude detection over a wide variety of terrain types and threat axes, the PEACE SENTINEL program provided for the purchase of five E-3A model aircraft modified to provide detection of

both airborne and maritime targets. Although not equipped with the highly advanced secure Joint Tactical Information Data System (JTIDS) data link found on US and NATO E-3s, the Saudi E-3 is able to provide its air picture via data link to the ground command and control system and elements of the Royal Saudi Navy. (1:61;7:76) To extend the on-station availability of the AWACS, eight Boeing 707 aircraft were modified to act as aerial tankers and designated as KE-3As. Also included in the program were three years of contractor maintenance, aircrew and maintenance training and the initial provisioning of spares. Total program cost is approximately $2.8 billion. (25:52)

Status

All five E-3 and eight KE-3 aircraft were delivered to the Kingdom without major schedule delays during 1986 and 1987. (25:6) The in-country training of RSAF aircrews has experienced delays, however, and the USAF and RSAF have just concluded extended negotiations that will allow for an extension of the PEACE SENTINEL Technical Assistance Field Team (TAFT) that has been providing training to RSAF aircrews in the Kingdom since May of 1986. (12)

PEACE SHIELD

Content

The PEACE SHIELD program is a $3.8 billion effort to provide increased ground-based radar coverage along with the critical communications and data connectivity necessary for a

truly integrated system. (18:85) It is comprised of the following major components:

--Radars. Seventeen General Electric FPS-117 L-band fixed, long range radars identical to those retrofitted to USAF radar sites in Alaska under the SEEK IGLOO program. Ideally suited to severe climates, these radars are ECM-resistant and feature highly redundant circuit design and computer-controlled circuit reconfiguration which allows them to operate in what is termed "minimally attended" status on a day-to-day basis. (18:85) The FPS-117 radars use a phased array antenna that will electronically scan a pencil beam signal in elevation while rotating in azimuth to give true three-dimensional detection capabilities. (18:87) The radars are to be installed around the periphery of the country, and will augment the six Saudi Air Force TPS-43 and replace the older Marconi 40T2 ground controlled intercept (GCI) radars already in the Saudi inventory. (17:52;14:82; 6:92)

Additional TPS-43 gap filler radars will be installed to provide more comprehensive coverage at various key locations around the country. A total of 14 of the advanced TPS-43 radars will be employed. (14:81)

--Command and Control Centers. One Command Operations Center (COC) at Riyadh and five Sector Operations Centers (SOCs) will provide centralized surveillance, command and control, and overall management of military air operations in the nation. (3:23) The SOCs will be located on

military installations at Dhahran, Taif, Tebuk, Khamis Mushait and Al Kharj. (17:52) Command and control from these centers will be enhanced by a networking of radars and command centers through the use of a digital transmission of target information via narrow band communications channels to RSAF sector operations centers. (18:87)

--Communications. In addition to voice telephone circuits, the data link communications discussed above will be expanded to include the networking of the hardened underground command center at RSAF headquarters at Riyadh, the SOCs (also underground and hardened), the 17 FPS-117 and 6 TPS-43 radars, and 10 E-3A data link ground entry stations (GESs). (17:52) The GES equipment will allow the E-3 air picture to be integrated with the ground radar picture and relayed to all other SOCs and the COC. Five of the GESs will be located at the SOCs, and five more will be located in remote sections of the Kingdom. Long-haul, high-frequency (HF) communications will be installed at the COC and the five SOCs. The SOCs will also be equipped with ultra-high frequency (UHF) radios. (24:15)

Status

The PEACE SHIELD program is a huge undertaking in terms of its complexity, but its development and installation remain essentially on schedule. Long range radar site and SOC construction are currently ongoing with overall systems integration tests scheduled to begin in May 1990. Although

still subject to possible schedule changes, the system is now expected to provide the Saudis with an Initial Operational Capability (IOC) by April 1991. (12)

CHAPTER V

TODAY'S THREAT

The global and regional threats facing Saudi Arabia continue unabated. The Kingdom will continue to to be threatened because of the importance of its oil reserves, its position of political leadership in the Arab world, and its historic rivalries with other regional states. (7:79-96) It is necessary to assess the potential threat the Kingdom must contend with both in the late 1980s, as well as in the future once the PEACE SENTINEL and PEACE SHIELD programs are fully implemented.

The future military capabilities of the RSAF must continue to address the possibility of both global and regional air threats. The general priorities of the Saudi military are:

1. Preserve sovereignty.

2. Provide a regional air and naval defense of its oil facilities.

3. Deter aggression from Iran and Iraq.

4. Defend against amphibious and armored raids.

5. Maintain internal security without having to rely on external assistance.

6. Develop an over-the-horizon reinforcement support capability from the US to be used only in a worst-case scenario. (7:112)

Target Array

The Saudis have successfully diversified their oil industry to the extent that the Ras Tanura oil facility is no longer the single critical node in oil production and transshipment. New pipelines and transshipment points on the Red Sea insure a continued flow of oil in the event of a loss of Persian Gulf facilities. Although this has reduced the strategic importance of Ras Tanura, it has also increased the target array the Saudi air defense system must now cover. It is unlikely that Iran could successfully attack any target outside the immediate area of the Gulf, but the air defense system must still be able to protect Red Sea facilities from potential threats. (7:63-65)

Saudi military modernization has also made its newly acquired military capability a target as well. The installation of medium range ballistic missiles southwest of Riyadh, the airbase at Dhahran with its new Tornado strike aircraft and modern F-15 fighters, and the new command and control centers now represent a critical set of targets.

In addition, symbolic attacks on the holy mosques in Medina and Mecca are viewed as possible targets for any potential adversary seeking to reduce Saudi prestige as the leader and protector of Islam. (7:35) Saudi leaders have said that their protection of the holy cities of Mecca and Medina is as important as the protection of the oil fields and related facilities. (17:54)

Concurrent with RSAF improvements, Iraq has continued

to upgrade its modern air force with new Soviet and French aircraft and munitions. Iraq now has the capability to reach any target in Saudi Arabia. (7:56) Yemen has acquired new MiG 23 aircraft that threaten the new Red Sea oil facilities and the strategically critical Bab el Mandeb strait at the south end of the Red Sea. (11:47)

Finally, the introduction of new weapons such as the Silkworm antishipping missile and medium range surface-to-surface missiles used by both Iran and Iraq in their "War of the Cities" in February and March of 1988 presents the RSAF air defense system with weapons that not only are difficult to detect, but almost impossible to intercept and destroy.

In summary, the immediate threat from Iran has been reduced, but the overall potential threat has increased and there are more Saudi targets to defend.

The Future Threat

Global Threat

Although US-Soviet relations are improving, the Persian Gulf/Red Sea oil facilities and SLOCs are a potential Soviet target in any future superpower confrontation. Soviet naval presence in the Gulf remains high, and basing rights obtained in South Yemen, Ethiopia, and on the island of Socotra in the Arabian Sea provide logistical facilities that would allow the conduct of operations in the area. (7:63-65) The Soviet ability to conduct air operations over the Arabian peninsula will remain limited unless aircraft are forward

deployed to Ethiopia or Yemen. (7:54)

Regional Threat

The future regional threat must be addressed given two likely scenarios concerning the future of the Iran-Iraq War: First, a resumption of hostilities; and second, an evolution of the current UN negotiations that leads to a lasting cessation of hostilities. Saudi Arabia also sees Israel as a potential adversary that must be addressed regardless of the course of the Iran-Iraq War.

Iran

Iran has stated that the ultimate target in the Gulf is not Iraq but Saudi Arabia, and has already conducted subversive operations in the Kingdom. Examples of these operations include the 1987 riots in Mecca during Haj (the annual Moslem pilgrimage) in which hundreds of Iranian Shi'ites and Saudi security forces died, and the bombing of the Ras Tanura oil facility in 1988 by Shi'ite terrorists. (7:10) Iran also claims Gulf islands belonging to Baharain and Saudi Arabia. Saudi leadership in the Moslem world is a direct challenge to Iran, and the Saudi military is the key to any successful cooperative Gulf military alliance. Furthermore, Iranian attacks on Saudi Arabia would be viewed in Iran as a symbolic attack on the United States. Saudi Arabia and the other moderate Gulf states fear Iran will rebuild its once powerful military and threaten all Gulf

states. (7:35)

Today the Iranian air force is only capable of flying a limited number of aircraft against Saudi targets. Spare parts and maintenance problems have grounded most F-4 and F-14 aircraft, and those that are capable of flying are probably operating without all of their sophisticated avionics systems functioning. They could, however, mount small strike missions at coastal targets such as Ras Tanura, or attack oil tankers transiting the Gulf. (11:47) Iran has also demonstrated the capability to use its newly acquired medium range missiles during the War of the Cities against Iraq as well as its Silkworm antishipping cruise missiles against oil tankers.

Iranian attacks against Saudi Arabia are presently deterred by the Saudi's demonstrated ability to detect, intercept and destroy Iranian aircraft. In May 1985, Saudi F-15s intercepted and shot down two Iranian F-4s attacking oil targets in the Gulf. (7:55-59) Further continued US naval presence in the area, and the US announcement in January 1988 that it would protect and escort any noncombatant vessels in the Gulf that requested assistance, further deters Iranian air or naval attacks.

Iraq

Iraq now has a large and well-trained military and an impressive inventory of Soviet and French aircraft. Border disputes remain unresolved with Saudi Arabia, and President

Sadam Hussein still sees himself as a contender for leadership in the Arab world. This combination of possible intentions, historic differences and present capabilities poses a potential threat of substantial proportions to Saudi Arabia. (7:57-58)

Israeli Threat

Although US augmentation of either Israel or Saudi Arabia is not likely if these two states entered into any level of hostilities, the perceived Israeli threat does affect Saudi thinking and allocation of resources.

The Saudis see Israel as a potential military adversary with the ability to conduct airstrikes in Saudi Arabia. Israel has demonstrated the capability to conduct long range air operations during the raid at Entebbe, the raid against the Iraqi nuclear reactor near Bagdad, and the raid at Tunis against the Palestinian Liberation Organization's headquarters (a distance of over 2000 kilometers). Further, the Saudis claim Israel has made frequent overflights of Saudi Arabia, and that these have been accompanied by symbolic gestures such as the dropping of equipment on Saudi military airfields and breaking the sound barrier. (7:66)

While Israel does not have the capability to conduct sustained operations in the Gulf, it does have the capability to attack selected military targets such as the bases in the northwest corner of the Kingdom, the new medium range missile

complex west of Riyadh, and the new oil transshipment facilities on the Red Sea. (7:66-69)

The potential Israeli threat is exacerbated by Saudi inflammatory language, such as that by Crown Prince Abdullah who stated in a speech on 13 September, 1984..."once Muslems achieve unity of will and action, Israel will be annihilated and disappear." (2:45), or when King Fahd told Arab ambassadors in Washington that..."the armed struggle against Israel is an existing necessity." (2:46) While the Saudis view the threat of air attack from Israel unlikely at present, they see a potential for future action and, as a minimum, see a requirement to enforce the sovereignty of their airspace against Israeli overflight. (7:66)

Threat Axes

The present and future threats can be differentiated into five probable threat axes. The first originates at Iranian bases across the Gulf, and would be directed at the oil facilities at Ras Tanura and the Saudi air base and command and control complex at Dhahran. The second also originates at the Iranian Gulf bases and would be directed at shipping passing through the Straits of Hormuz. The third originates at Iraqi air bases, passes through or to the west of Kuwait and can reach any target in Saudi Arabia. The fourth axis runs from Ethiopia or South Yemen and is directed toward the oil targets on the Red Sea, Saudi military facilities in Asir province, or symbolic targets such as

Mecca or Medina. The final axis originates in Israel and can theoretically be directed towards any of the above targets. (7:55-65)

Clearly, Saudi Arabia faces a continuing and formidable threat that can only be countered by the most capable of air defense systems. As was previously mentioned, the Kingdom is now engaged in a multi-billion dollar upgrade of its defenses. It is appropriate to evaluate those improvements in light of the present and future threat.

CHAPTER VI

SAUDI AIR DEFENSE CAPABILITIES--NOW AND IN THE FUTURE

Through the provisions of the PEACE SHIELD and PEACE SENTINEL programs, along with related improvements gained from similar programs to improve its fighter forces and base structure, the organic capability of the RSAF to provide for the defense of Saudi Arabia has improved dramatically. Although the Saudis now possess an air defense system capable of countering many of their present and future threats, they will continue to face significant limitations in the near term. Some of these limitations may never be overcome with organic assets, and must be examined in any overall assessment of Saudi capability.

Equipment

All elements of the PEACE SENTINEL program are now in place, but many elements of the PEACE SHIELD program and the associated construction of facilities are still two years from full completion. (21:87)

A General Accounting Office survey has estimated that Saudi E-3s could provide less than half the capability currently provided by US E-3s deployed to Riyadh AB. Although the US has had only four E-3s deployed, that operation has actually been supported by the entire US fleet of 33 aircraft and its associated CONUS logistical support

base. US E-3s in Saudi Arabia flew at a rate of 200 hours per aircraft per month, and were provisioned with spares and maintenance support to maintain that rate indefinitely. Saudi E-3s are programmed and provisioned for rate of only 65 hours per month per aircraft. (21:87-89) Based on this capability, the Saudis could fly a 24 hour wartime orbit for only 2 to 3 weeks without US support beyond that already provided by the FMS case. If a second orbit was required, this capability would be further reduced to a matter of just a few days. (Normal planning factors call for a minimum of four E-3s to fly one 24 hour orbit for an indefinite period. With tanker support, the use of but two aircraft can provide initial 24 hour coverage, but increased maintenance requirements from such flying will soon result in a decrease in aircraft availability).

Battle management capability has improved significantly with the addition of the E-3s. Battle managers at Riyadh and Dhahran can now receive AWACS data on display consoles in both locations and allocate resources based on a real-time air picture that is far more detailed and comprehensive than that previously available.

The E-3, when combined with KE-3 tankers and F-15 interceptors, give Saudi Arabia the capability to react to a threat in any part of the country. This capability to provide warning, mass interceptors, and to command and control the air battle fixes the previous limitations caused by a lack of sufficient tactical warning. As a result, there

will be far less need to disperse limited numbers of interceptors to cover wide areas of possible ingress by low-flying strike aircraft. The Saudis now have the capability to defend one of the five threat axes for a matter of weeks, or two threat axes for a matter of days. After these short periods, US augmentation would be required. The Saudis realize the shortcomings of their own assets and have requested to buy more E-3s, but this request has not been acted upon. (15:100;7:73)

Saudi E-3s are also capable of data sharing with US AWACS and US naval units in the region. This data sharing capability, and an understanding that the Saudis would continue to share that data in the future, was agreed to as part of the original FMS case. To implement this capability US crewmembers would have to fly onboard the Saudi E-3, however, since US cryptographic equipment and material would be needed on the Saudi aircraft to establish this communications link. (23:188;10:2)

Future Saudi capabilities will be enhanced with the completion of the installation of air defense radars capable of covering all threat axes (except at very low altitude), and by a complete tactical command and control system capable of managing a totally integrated air defense system. This system will, however, continue to be limited by a lack of very low altitude radar coverage in those areas not supported by AWACS. (7:73)

Support Capability

The RSAF depends on foreign contractors for nearly all logistics and maintenance support for its modern aircraft. The US contribution to the Saudi AWACS program in this area includes approximately 135 personnel on a continuing basis. The USAF and Boeing will be required to provide some support for the life of the AWACS, a period estimated to be between 20 and 30 years based on a 30,000 hour airframe life. (2:49-55) The present system is providing adequate support for the planned flying program, and both the Saudis and the US agree that the arrangement is beneficial not only because it works, but because it provides a support framework for US reinforcing elements if needed at a future date. In addition, it also frees up critical Saudi technical personnel to concentrate their efforts in other areas in the country. (7:161) The Saudis have voiced the fear, however, that reliance on US contractors creates a possible situation in which US expertise would be withdrawn if, in a regional conflict, Saudi Arabia's role ran counter to US national interests. (7:138)

Personnel Capability

The RSAF has a core of professional, trained personnel that fly their new advanced aircraft and man their command and control facilities. The first two instructor crews for the RSAF E-3s successfully completed US training courses, met US standards of performance and returned to

Saudi Arabia to form the core of an aircrew training force. Once trained, Saudi aircrews have had little difficulty performing operational missions. There is, however, a significant limitation in the manpower pool available for training. In fact, the Saudi buy of F-15s was restricted to only 62 aircraft primarily based on the limited manpower pool capable of being trained to fly and support that weapons system. (13:177) This limitation was foreseen in the early days while formulating the PEACE SENTINEL FMS case, and US participation as a supplement to Saudi crews was planned throughout the life of the system. E-3s were to be flown by joint US and Saudi crews through 1990, and beyond that timeframe some undetermined degree of augmentation was to be required in the technician area for the life of the system. (8:44) In 1981, when Boeing stated the requirement for 17 highly trained technical personnel on each crew, the RSAF acknowledged that they would probably not have the manpower available in time to support this requirement. (5:15)

This manpower limitation is a historical problem for Saudi Arabia, and must be understood in relation to the Saudi population base and the priorities of the government. Saudi Arabia has a small population (approximately 7 million), mostly of Bedouin origins. There are few native Saudis that have technical backgrounds, although government initiatives are now being pursued to provide this technical training to current and future generations. Over 50 percent of the current technical workforce is made up of expatriates from

other Arab states and the United Kingdom. The Saudis have put priority on development of their economic and social sectors, and as a result most of the skilled native Saudis available work in these areas. The Saudis do view the fact that the military is highly dependent on foreign and expatriate support as a potential limitation during a future conflict. Many of these personnel could decide to leave, be forced to leave, or could in some cases form a "fifth column" in the nation depending on the nature of the conflict and the states involved. (7:48,80)

The Shortfalls

Saudi near-term shortfalls are a lack of an adequate command and control communications network to conduct battle management; too few E-3s to cover more than one (of the five possible) threat axes for more than a short period of time; dependence on the US for logistical support and technical expertise; a shortage of qualified manpower to support training requirements; and a dependence on expatriates to provide many important support functions. The only one of these shortfalls that will be solved in the short term is the full modernization of the air defense command and control network by approximately 1992. Lack of sufficient E-3s to cover potential threats, a small manpower pool of trainable personnel, reliance on foreign support, and the potential problems due to large numbers of expatriates in the workforce will be with the Saudis for the foreseeable future.

CHAPTER VII

PRESENT AND FUTURE AUGMENTATION

As detailed in the previous chapter, Saudi Arabia has made significant recent progress in developing its air defense capabilities. Those limitations that remain, however, focus attention on the fact that not all potential threats to the Kingdom can be met today, or in the foreseeable future. While it is not in the purview of this paper to examine the political desirability or feasibility of continued or additional military support to that country, it is appropriate to examine those shortfalls and make an assessment of potential US contributions should they be called for by US National Command Authorities.

The planned improvements to the RSAF organic air defense capabilities are not yet complete at this writing, primarily due to the protraction of E-3 aircrew training and the delays in completion of the PEACE SHIELD program. To adequately assess Saudi capabilities in relation to their threat, and the potential need for US augmentation, it is necessary to examine two timeframes. For the sake of this discussion, the two timeframes will be termed "Today," relating to current (early 1989) Saudi capabilities, and "The Future," using an approximate 1992 baseline once all current air defense modernization programs are scheduled to be completed.

The potential threat (as it pertains to air defense) facing the Kingdom will be examined within each of these time frames in comparison with evolving Saudi capabilities. To make the analysis manageable, the threat has been divided into four categories:

1. Peace. As it will be used here, "peace" simply means an absence of outright hostile action, and the fact that such action is not imminent.

2. Increased Tension. A period of increased tension is defined as a time when key political or military factors indicate the increased likelihood of an attack on the country. As has so often been the case with the worldwide employment of the US AWACS, employment of the RSAF E-3 during such a period could well be used to send both military signals (surveillance of a threat axis) as well as political signals (national concern expressed through non-threatening military preparations) to a potential foe.

3. Hostilities--Single Axis. In this scenario actual attacks are imminent or are occurring, but are limited to a single attack axis and, in all likelihood, a single adversary.

4. Hostilities--Mutli-Axis Threat. A multi-axis hostile threat is of significance since it will normally require multiple E-3 orbits, perhaps each on a continuous basis, to provide adequate threat warning, surveillance and fighter control.

The benefits of US augmentation will be examined

both from the perspective of the air defense of the country, as well as from those US AWACS applications in the region beyond solely filling Saudi air defense shortfalls.

Saudi Arabian Air Defense

Today/Peace

In terms of countering the threat, there is most certainly no need for continued US augmentation of the RSAF, even at their current levels of training, during a period of peace. A guarded assessment can be made that Saudi Arabia does, in fact, find itself in these circumstances today. While the outcome of the current United Nations ceasefire and negotiations between Iraq and Iran cannot be predicted with certainty, it can be argued that the threat of an outright attack against Saudi Arabia from either of these countries is, at this time, quite low.

In January 1989, the US reduced its 24 hour orbit over eastern Saudi Arabia to 12 hours per day as a reflection of the reduced threat in the Gulf area. At this writing, the US has already started a draw-down of its presence by removing two of its four E-3s and reducing its tanker commitment accordingly. The Saudis should now be able to take an increasing share of what flights may be needed for both periodic surveillance and the appropriate "vigilance" deemed to be necessary in the Gulf region. Much of that flying can be accomplished as an integral as part of the RSAF E-3 crew training program.

The US withdrawal of its aircraft and supporting forces can be phased in with due regard to the growing Saudi organic capability, but could be accomplished in but a few months. It should be noted that there will be a continuing need for US assistance in the training of Saudi crews, but this can well be accomplished using Saudi aircraft. As ably demonstrated in both the 1979 and 1980 deployments, should the threat in the Gulf area change, US aircraft and crews could be back in operation literally overnight to resume their surveillance flights.

Today/Increased Tensions

Saudi aircrews will have a growing capability to use their organic assets to respond to this requirement. As defined earlier, this situation may involve a true threat, or just the potential for a difficult situation escalating into a conflict. The Saudis now have the ability to provide periodic surveillance on any of their potential threat axes, and to do so as a national sign of resolve totally independent of US assistance. Should the threat warrant orbit coverage beyond that yet available, or should the political situation also call for a US show of resolve, US AWACS could well be called upon to augment Saudi forces.

The exact US commitment would vary in the near future as Saudi crews become available, but this scenario would much resemble a resumption of the hostilities of the Iran-Iraq War that required four aircraft to establish a single 24 hour

orbit. Although the Saudis will ultimately have the ability to fly such an orbit on their own, it should be remembered that the US was able to do this for an extended period only with extraordinary support measures (see page 28 for details). As a result, the anticipated "cost" of the Saudi orbit--both in terms of daily coverage and overall duration of the commitment--would well determine how quickly and how heavily the US would have to augment the Saudis in terms of both aircraft and logistical support. At the outset of the establishment of a permanent orbit, US augmentation could be limited to additional crewmembers and logistical support necessary for the existing RSAF E-3s.

Today/Hostilities--Single Axis

Unless this scenario developed as a result of an intelligence failure, it would in all likelihood occur as a result of an escalation from a period of increased tension. Even if not warranted during the period of tension, hostilities would almost certainly require the establishment of a 24 hour Saudi orbit along the threat axis.

If US aircraft and crews were not involved during a period of tension, augmentation would be called for if hostilities were expected to last for any significant period of time (two to three weeks). If not already in country, it is very likely that US E-3 augmentation would be considered necessary almost at the outset of hostilities, as both a sign of US resolve and support for Saudi Arabia, as well as to

provide an immediately available backup in the event of Saudi combat losses or intractable maintenance problems.

Today/Multi-Axis Threat

Although this scenario is the most threatening, it is also the one with the most clear-cut requirement for significant E-3 augmentation. Exact numbers of aircraft cannot be postulated, other than to use the four aircraft per orbit (axis) guideline, with an added indeterminate need for spares as a result of combat losses. A threat of this nature could well threaten the survival of Saudi Arabia, and the US commitment to that country's defense could in all likelihood extend far beyond a deployment of AWACS aircraft.

Any significant hostile move by the Soviet Union in the region that imperiled Saudi Arabia would probably call for this same US response, regardless of the true number of "axes" initially regarded to be at risk. The overwhelming Soviet forces that could be brought to bear, along with their potential for supporting hostilities originating from radical states in the area, would combine to make a potential aggregate threat in the region that required the maximum feasible US commitment.

Future/Peace

Given a successful transition to a completely integrated air defense system as contained in the PEACE SENTINEL and PEACE SHIELD programs, there would be no

requirement for a continuous US AWACS augmentation in Saudi Arabia. In the interests of mutual training and interoperability, and given stated US interests in the region, periodic US training deployments should be considered. This type of training would require appropriate negotiations, but a minimum of one aircraft and two crews should deploy on at least a quarterly basis for a period of about one week. This would give ample opportunity for US and Saudi E-3s to interoperate and, if properly coordinated, work with US naval elements that will be operating in the Gulf area.

Major air defense exercises could be scheduled to coincide with some of these US deployments. With Saudi liaison officers on board, these exercises would give valuable theater training to US crewmembers. In addition, both USAF and RSAF crews would gain needed experience working in a complex multi-orbit, joint scenario that could realistically emulate the manner in which their aircraft might be employed at some point in the future. Training deployments such as these are routinely flown now by US AWACS crews with their counterparts in the air and on the ground around the world.

Future/Increased Tension

Although the RSAF will have trained its full complement of E-3 aircrews, the need for US augmentation in this scenario will be essentially the same as for dealing

with like conditions in the near term. Again, the limiting factor for the Saudis will be the ability to fly a 24 hour orbit for an indefinite period of time. US augmentation would be called for when Saudi aircraft and support facilities could no longer cope with the flying hour rate necessary for permanent orbit coverage.

Future/Hostilities--Single Axis

With full RSAF E-3 capability available, US augmentation would be determined by the duration and scope of the conflict. At the outset, the RSAF should be able to fulfill its surveillance requirements from its organic resources, but US forces would surely have to be prepared to deploy if the conflict was not resolved quickly. The same would be true if the RSAF were to experience an early loss of an aircraft. The same potential need for the display of US resolve through an early deployment of aircraft would be as applicable in the future as it is today.

Future/Hostilities--Multi-Axis

There would be no significant difference in the needed US augmentation between this scenario in the near term or in the future. Saudi AWACS availability simply is not now, nor will it be in the foreseeable future, sufficient to meet the multi-axis threat for any extended period of time.

US Regional Applications

US naval forces continue to operate in the Persian Gulf. USAF interoperability with these forces must be exercised to ensure that operational capability is available if needed again during conflict, or in a time of tension such as the recent Earnest Will operation to escort US-flagged tankers through the Straits of Hormuz.

US AWACS presence on a periodic basis in the Persian Gulf area is of vital importance to US national interests. Whether as a result of periodic joint training scenarios, or as a result of other taskings, a continued AWACS presence of some form should be expected. "Continued" here does not mean "continual"--US E-3 operations need only be of a frequency and intensity sufficient to provide theater training. This would also provide a recognized and relatively non-threatening presence in an area so vital, and so publicly advertised as vital, to US and Western interests.

CHAPTER VIII

CONCLUSION

Saudi Arabia's air defense capability has been significantly improved over the last eight years. The acquisition of a modern fighter force equipped with effective weapons, a fleet of AWACS aircraft and airborne tankers, and the continuing improvements in ground radar and command and control facilities combine to form an air defense system second to none in the region. These improvements and US augmentation over the past eight years have successfully deterred Iranian attack on critical oil facilities. In addition, the Saudis have successfully diversified their oil industry and sea lines of communication to the point that an attack on one target would not cripple their economic system.

Although the immediate threat to Saudi Arabia has diminished because of the Iran-Iraq ceasefire, potential future threats and the continuing superpower confrontation will require Saudi Arabia and the US to maintain a strong deterrent for the foreseeable future. The nature of the continuing US role in Saudi air defense will depend on the security atmosphere in the Gulf. Saudi capabilities now essentially mirror that available during the air defense augmentation initially provided by the US in 1980. Although logistics and crew limitations would limit sustainability, the system could react to a potential threat on one axis

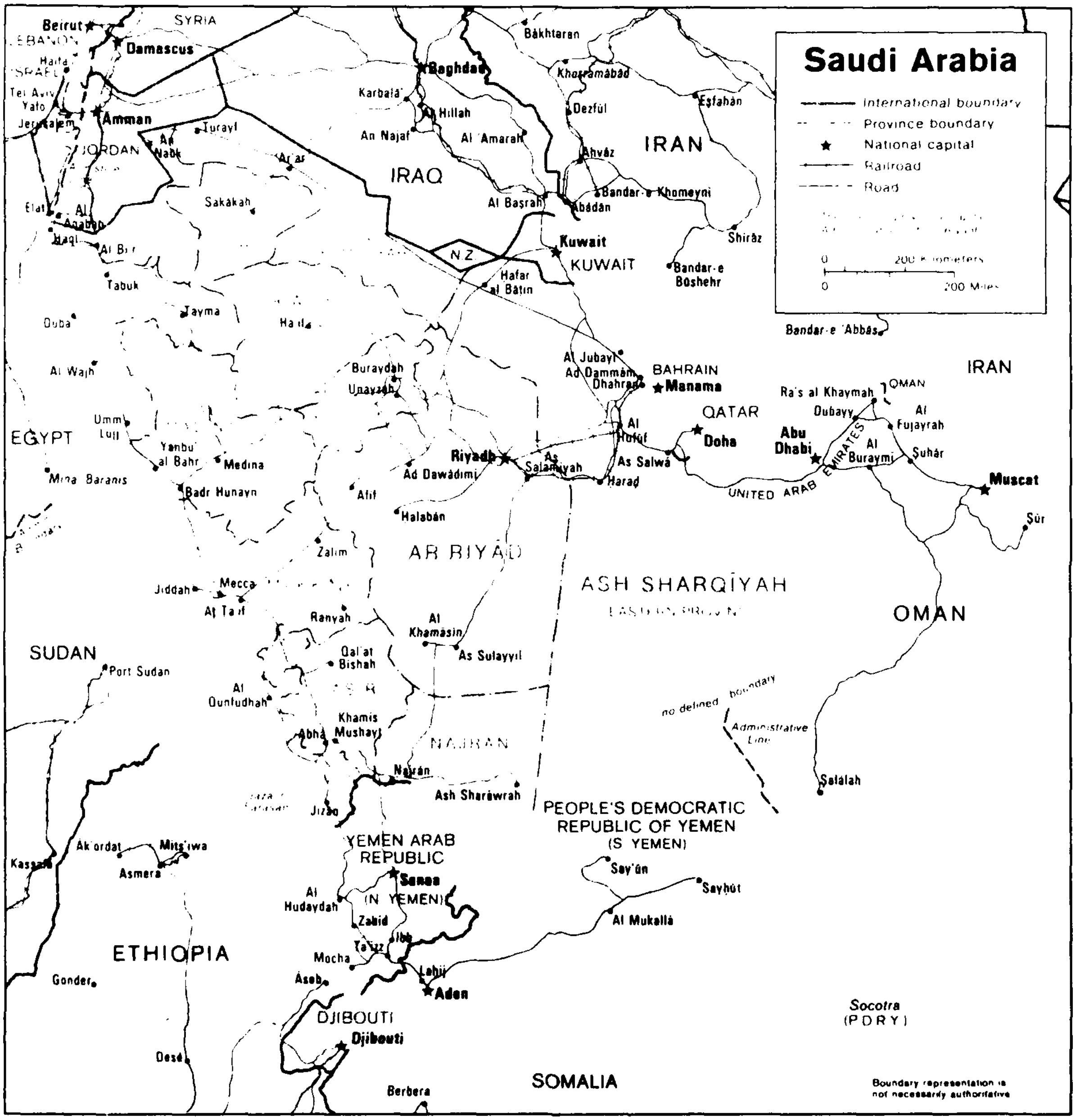
during increased tension and for the initial stages of actual hostilities. If a multi-axis threat surfaced, US augmentation would be required almost immediately. If the threat level increased further, additional US assistance would be necessary.

US presence in the region in the form of logistical support, training expertise and technical assistance will be required throughout the life of the air defense system. In addition, frequent deployments of US E-3s to the area will be required to maintain interoperability and insure that joint employment of USAF and RSAF E-3s in the future would be successful.

For more than eight years, the deployment of US resources has successfully deterred aggression against Saudi Arabia while helping to cement military and political ties with valued allies in the Gulf. These benefits, however, have not come without accompanying costs. Scarce E-3, tanker and command and control assets have been diverted from other theaters that are also important to US interests. In addition, the increased aircraft utilization rates necessary for 8 continuous years of 24 hour-per-day flying has increased spare parts usage and strained the supply of high-dollar components, while simultaneously decreasing the life of the entire US E-3 fleet. The overall quality of US aircrew training has also been affected due to the narrow focus of operations in the Gulf.

Given the current situation in the Gulf vis-a-vis the

growing Saudi organic capability, it is time to reassess priorities and redeploy the remaining two US E-3s and supporting tankers from the region. Although the US must maintain its over-the-horizon capability to quickly reinforce, the RSAF is now ready to provide routine air defense of the Kingdom without continued US augmentation.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Al Wajh
Buraydah
Unayzah
Umm Lujj
Yanbu' al Bahr
Medina
EGYPT
Mina Baranis
Badr Hunayn
Afif
Halaban
Zalim
AR RIYAD
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As Salamiyah
Harad
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Al Fujayrah
Al Buraymi
Suhar
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UNITED ARAB EMIRATES
ASH SHARQIYAH
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Jiddah
Mecca
At Ta'if
Ranyah
Al Khamasin
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Qal'at Bishah
Al Qunfudhah
Khamis Mushayt
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(S. YEMEN)
Say'un
Sayhut
Al Mukalla
YEMEN ARAB REPUBLIC
(N. YEMEN)
Sanaa
Al Hudaydah
Zabid
Ibb
Ta'izz
Mocha
Lahij
Aden
Ak'ordat
Mits'iwa
Asmera
Kassala
ETHIOPIA
Gonder
Aseb
DJIBOUTI
Djibouti
Dese
Berbera
SOMALIA
Socotra
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Boundary representation is not necessarily authoritative

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